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L5: Entry 7 of 8 File: USPT

US-PAT-NO: 5351286
DOCUMENT-IDENTIFIER: US 5351286 A

TITLE: Method and system for billing an ISDN data user interconnection to the public switched telephone network

DATE-ISSUED: September 27, 1994

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
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US-CL-CURRENT: 370/352; 379/114.01, 379/116, 379/93.03, 379/93.33

CLAIMS:

We claim:

1. A method for connecting and billing a first user on a packet network being capable of transmitting packet communications, the first user having a billing identification corresponding to a billing account, to a second user on a voice-band network, the voice-band network being capable of allocating the costs of a voice-band call, the method comprising the steps of:

decoding a data packet from a packet communication initiated by the first user to determine the first user's billing identification;

establishing a voice-band call to the second user over the voice-band network; and

transmitting the billing identification to the voice-band network for use by the voice-band network to allocate the cost of said voice band call to the first user's billing account.

2. The method of claim 1 wherein the first user's billing identification is the first user's telephone number.

3. The method of claim 1 further comprising the step of screening the first user's billing identification to determine if a connection on the voice-band network is authorized.

4. The method of claim 1 further comprising the step of screening the first user's billing identification to determine if a connection to the second user is authorized.

5. A system for connecting and billing a first user on a packet network being capable of transmitting packet communications, the first user having a billing identification corresponding to a billing account, to a second user on a voice-band network, the voice-band network being capable of allocating the costs of a voice-band call, the system comprising:

decoding means connected to the packet network for receiving data packets

associated with the first user's packet communications and for decoding said data packets to determine the first user's billing identification;

first transmitting means responsive to the decoding means for establishing a voice-band call to the second user over the voice-band network; and

second transmitting means responsive to said decoding means and said establishing means for transmitting the billing identification to the voice-band network for use by the voice-band network to allocate the cost of said voice band call to the first user's billing account.

6. The system of claim 5 wherein the billing identification is the first user's telephone number.

7. The system of claim 5 wherein the first network is an ISDN network.

8. The system of claim 5 wherein the voice-band network is a public switched telephone network.

9. The system of claim 5 further comprising screening means in communication with the decoding means arid the first transmitting means for screening the first user's billing identification to determine if a connection on the voice-band network is authorized.

10. The system of claim 5 further comprising screening means in communication with the decoding means and the first transmitting means for screening the first user's billing identification to determine if a connection to the second user is authorized.

11. A method for providing data communication between a first user on an integrated digital services network, the first user having a billing identification corresponding to a billing account, and a second user on a voice-band network, the voice-band network being capable of allocating the costs of a voice-band call, the method comprising the steps of:

receiving a call establishment message containing data information from the first user;

decoding the call establishment message to determine the first user's billing identification;

establishing a voice-band call to the second user over the voice-band network for transmission of data information from the first user in a modulated format; and

billing first user's billing account for the call established over the voice band network according to said first user's billing identification.

12. The method of claim 11 wherein the call establishment message is a data packet transmitted over an X.75 interface to a network access device connected to the public switched telephone network.

13. The method of claim 11 wherein the call establishment message is a call setup request sent on an ISDN signalling channel within an ISDN interface connected to a network access device further connected to the public switched telephone network.

14. The method of claim 11 wherein the first user's billing identification is the first user's telephone number.

15. The method of claim 11 further comprising the step of screening the first user's billing identification to determine if a connection on the voice-band

network is authorized.

16. The method of claim 11, further comprising the step of screening the first user's billing identification to determine if a connection to the second user is authorized.

17. A system for providing data communication between a first user on an integrated digital services network, the first user having a billing identification corresponding to a billing account, and a second user on a voice-band network, the voice-band network being capable of allocating the costs of a voice-band call, the system comprising:

receiving means for receiving a message containing the first user's billing information;

decoding means responsive to the receiving means for decoding said message to determine the first user's billing identification;

first transmitting means responsive to the decoding means for establishing a voice-band call to the second user over the voice-band network for transmission of data in a modulated format;

second transmitting means for adapting and then transmitting over said voice-band network in a modulated format the first user's data received by said receiving means; and

billing means responsive to the first transmitting means and the decoding means using the extracted billing identification such that the cost of said voice band call is allocated to the first user's billing account.

18. The system of claim 17 wherein the receiving means receives a data packet over an X.75 interface wherein said data packet contains billing information from the first user.

19. The system of claim 18 wherein the billing identification is the first user's telephone number.

20. The system of claim 18 wherein the first network is an ISDN network.

21. The system of claim 18 wherein the voice-band network is a public switched telephone network.

22. The system of claim 18 further comprising screening means in communication with the decoding means and the first transmitting means for screening first user's billing identification to determine if a connection on the voice-band network is authorized.

23. The system of claim 18 further comprising screening means in communication with the decoding means and the first transmitting means for screening the first user's billing identification to determine if a connection on to the second user is authorized.

24. The system of claim 17 wherein the receiving means receives a circuit switched data call set-up packet on a signalling channel over an ISDN interface.

25. The system of claim 24 wherein the second transmitting means employs a rate adaption protocol for adapting the transmission rate for the data received from said first user to the transmission rate of the modulated data over the voice-band connection.

26. The system of claim 25 wherein said rate adaption protocol is rate adaption

protocol V.120.

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L5: Entry 2 of 8 File: USPT

US-PAT-NO: 6104704
DOCUMENT-IDENTIFIER: US 6104704 A

TITLE: Methods and apparatus for gathering and processing billing information for internet telephony

DATE-ISSUED: August 15, 2000

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
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US-CL-CURRENT: 370/252; 370/401, 370/546, 379/114.21, 379/114.23, 379/114.24

CLAIMS:

We claim:

1. A billing server for processing and maintaining billing information for Internet telephony connections, comprising:

a receiver for receiving digital packets containing information describing an Internet telephony connection;

an Internet Service Provider ("ISP") database for storing an index of ISPs, each of said ISPs being associated with an ISP identifier;

a client database for storing an index of clients, each of said clients having an associated client identifier;

a billing record database adapted to store billing information relating to said Internet telephony connections; and

a processor for:

extracting, from said packets, relevant billing information from said Internet telephony connections,

extracting, from said packets, source and destination ISP identifiers of said packets,

looking up said source and destination ISP identifiers in said ISP database and identifying said source and destination ISP's from said source and destination ISP identifiers,

extracting, from said packets, client identifiers,

looking up said client identifiers in said client database,

identifying said clients from said client identifiers, and

constructing a billing record using said relevant billing information, source and destination ISP identifiers, and client identifiers.

2. The billing server of claim 1, further comprising a database for storing a plurality of additional billing records.

3. The billing server of claim 2 wherein said relevant billing information comprises a start and end time of said Internet telephony connection.

4. The billing server of claim 3 wherein said relevant billing information further comprises identification of a use in selection of an enhanced service.

5. The billing server of claim 4 further comprising a transmitter for transmitting real-time billing information to client devices.

6. The billing server of claim 5 wherein said real-time billing information includes an elapsed time of a connection.

7. The billing server of claim 6 wherein said real-time billing information includes a cumulative cost of a connection.

8. The billing server of claim 7 wherein said real-time billing information includes information suitable to provide a display of geographic routing of a connection.

9. The billing server of claim 8 wherein said real-time billing information includes information suitable to provide a display of packet density of a connection.

10. A method of billing for Internet voice telephony connections between two or more clients, comprising the steps of:

receiving notification of initiation of an Internet voice connection;

receiving digital packets containing connection information relating to said connection;

extracting, from said packets, Internet Service Provider ("ISP") codes associated with originating and terminating ISPs for said connection;

extracting, from said packets, user codes associated with originating and terminating clients for said connection;

using said ISP codes to identify said originating and terminating ISPs for said connection;

using said user codes to identify said originating and terminating users for said connection;

receiving notification of termination of said connection; and

constructing a call detail using said connection information and said identifications of originating and terminating ISPs and clients.

11. The method of claim 10 further comprising the step of storing said call detail.

12. The method of claim 11 further comprising the step of using said stored call details to construct a billing record.

13. The method of claim 12 wherein said billing record comprises a record of all Internet telephony connections originating from or terminating at a particular ISP during a specific time period.

14. The method of claim 13 further comprising the step of transmitting said billing record to an associated ISP.

15. The method of claim 14 further comprising the step of transmitting billing information to said originating and terminating clients during said connection.

16. A billing server for processing and maintaining information for Internet telephony connections, said connections being implemented through the transmission of digital packets between clients of one or more Internet Service Providers ("ISPs") connected to an Internet, said digital packets being transmitted from one ISP to another via the Internet, said billing server comprising:

a receiver for receiving digital packets from one or more ISPs, said packets containing information defining a beginning and termination in time of an Internet telephony connection, said packets further containing ISP identifiers, said ISP identifiers being associated with an originating and terminating ISP of said Internet telephony connection, said packet further containing client identifiers associated with an originating and terminating client of said Internet telephony connection, said packets further containing information identifying selected enhancements and features of said Internet telephony connection;

an ISP database for associating each of said ISPs with each of said ISP identifiers;

a client database for associating each of said clients with each of said client identifiers;

a billing record database for storing records associated with each of said Internet telephony connections;

a processor for identifying said originating and terminating ISPs and said originating and terminating clients by referring to said associated ISP and client identifiers in said ISP and client databases, constructing a billing detail for each of said connections, said billing detail identifying said originating and terminating clients and ISPs and said beginning and terminating time for each of said connections, said billing detail also identifying use of said selected enhancements and features of said connections, storing each of said billing details in said billing records database, assembling for each of said originating and terminating ISP's a billing record, said billing record comprising all of said billing details for Internet telephony connections associated with said ISP during a selected time period, and storing each of said billing records in said billing records database; and

a transmitter for transmitting connection information to each of said clients during each of said connections and for periodically transmitting said billing records to each of said ISPs.